Section II:

Description of the Study Area Resources

OSPREY

The lower Delaware River is unique in its diversity of significant resources. A high density of population and recreational opportunities combine here with a wealth of natural, cultural and historic features of unparalleled national significance. The river valley contains habitats that do not occur elsewhere in the region. For example, there are sheer cliffs that rise 400 feet above the river. Southern facing cliffs are dry and desert-like, and are home to prickly pear cactus. North-facing cliffs exhibit flora usually found only in arctic-alpine climates. The river itself provides habitat for American shad, striped bass, and river herring, providing a high quality recreational and economic resource. The river is an important component of the Atlantic Flyway, one of four major waterfowl routes in North America. From an historic viewpoint, the river is one of the most significant corridors in the nation, with crucial infrastructure still intact. The corridor contains buildings used during Washington's famous crossing, historic navigation canals, Native American and colonial era archaeological sites, mills, etc. Just as important is the magnificent scenery. The view from the river for most of its length is of an undisturbed natural area, despite development taking place in the corridor.

The Lower Delaware Wild and Scenic Task Force identified five major categories of resources that require proper management in order to protect the river corridor:

Water Quality

Natural Resources

Historic Resources

Recreation

Open Space

In addition, Economic Development and its relationship to river management is discussed, and guidelines for Education and Outreach are presented. Each of these categories is described in detail below. The relevant goals, policies and implementation strategies as determined by the Task Force are set forth in Section IV.

Water Quality

"It certainly begins with these little micro-organisms in the water column and keeps going up through the insects, through small amphibians, to little fish to big fish...we're at the top of that chain...if that chain starts to break down, so do we..."

Cynthia Poten, The Delaware Riverkeeper

Before the settlement of the Delaware River watershed by Europeans in the seventeenth century, water quality was presumably pristine. The first impacts on the environmental values of the river were from the drainage of wetlands, land clearing, farming, and intensive fishing. As populations grew, pollution from sewage and industrial wastewater grew proportionately. By the time of the American Revolution, pollution of the Philadelphia waterfront and various tributaries within the city was a serious problem. Until safe water supplies were provided in the latter part of the nineteenth century, thousands of people who drank Delaware River water died of waterborne diseases. The desire to escape urban areas during the summer epidemics was a major reason for the growth of the vacation-resort industry in the Delaware River Basin north of Trenton.

By the early years of the twentieth century, key fish populations had all but collapsed due to pollution, habitat destruction, and over-fishing. Water quality studies conducted from 1910 to 1930 found pollution in the tidal Delaware River between Trenton and Wilmington to range from "substantial" to "gross." In the non-tidal Delaware, zones of pollution were documented downstream of Port Jervis, New York; within the Delaware Water Gap; and from Easton, Pennsylvania, to Trenton, New Jersey. The pollution, caused by a combination of runoff from coal mines, inadequate sewage treatment, and industrial wastes, was serious enough to necessitate the shutting off of Trenton's water intake from the river when there was intense rain in the Lehigh Valley watershed.

Water pollution grew worse during World War II. In many sections of the Delaware, industrial activity related to the war effort intensified dramatically and diverted resources that were necessary for pollution abatement programs initiated before the war. By the end of the war, water pollution in the Delaware River Basin was at its maximum — one of the most serious water pollution problems in the country. Typifying the seriousness of the problem was the Delaware Estuary, which in 1946 experienced a 20-mile zone of zero dissolved oxygen, preventing all migratory fish from passing.

A pollution control effort was launched in 1936 with the establishment of the Interstate Commission on the Delaware River Basin by the four Delaware River Basin states. By the end of the late 1950's, there were 236 wastewater treatment plants in the basin compared with 63 in the 1930's. Water quality was greatly improved by this effort.

"It is impossible to separate the solutions to the problems of pollution and depletion of the river from the reforms in land use planning and regulation that are being discussed."

The Delaware River Basin, 1975, Council on Environmental Quality

The Delaware River Basin Commission (DRBC), created in 1961, launched a second-generation water control program aimed at reducing pollution from industrial discharges and other point sources, and at more thorough treatment of wastes at sewage treatment plants. This program caused water in the Delaware River to become cleaner than at any time in the twentieth century. In the 1994 Delaware River and Bay Water Quality Assessment Report, the DRBC assessed the status of water quality as observed in 1992 and 1993. Water quality in the Delaware Water Gap to Trenton reach was generally considered good with the only concern being occasional high pH levels. Previous studies by DRBC determined that the main cause of violations to DRBC water quality standards is aquatic plant photosynthesis and respiration, natural phenomena that pose no apparent harm to fisheries.

The water quality in the segment from Trenton to the Philadelphia/Bucks County border has been improving, and in 1991 DRBC raised water quality criteria for fecal bacteria to reflect the fact that the entire reach had obtained the swimmable goal of the federal Clean Water Act. This reach, however, along with other reaches in the Delaware Estuary, is currently subject to intermittent fish advisories due to toxics found in fish tissue by DRBC and state researchers. A multi-year interstate toxic management program to address this problem is nearing completion. Among some twenty water tributaries that flow into the river segment from Trenton to the Philadelphia/Bucks County border are two that contribute major volume to the river, Neshaminy Creek, PA, and Rancocas Creek, NJ. Data compiled by the Delaware Riverkeeper Network and governmental monitoring programs on these tributaries find water quality generally fair to poor, impacted primarily by agricultural, residential and roadway runoff.

Water pollution control in the Delaware River is the joint responsibility of the federal government (U.S. Environmental Protection Agency), the environmental protection departments of the four basin states, and the Delaware River Basin Commission. These agencies conduct monitoring, regulatory functions, planning and other water quality management functions.

"Non-point" Source Pollution

At present, the DRBC, state governments and many local governments are paying close attention to what is known as "non-point" source pollution. Non-point does not come from a single easily-identifiable source, but results from contaminants that are carried to watercourses in storm water runoff. Chief among these non-point contaminants are oils and salts from

roads and parking lots, pesticides and herbicides from lawns and crop fields, and eroded soil from construction sites and farms. Soil erosion creates unconsolidated particulates that are carried downstream in the water column. These sediments fill crevices and cover bottoms that rob the ecosystem of its biological niches and cause havoc with the nutrient basis of the food chain.

Although the DRBC and state governments have some regulatory authority that can mitigate the problem of non-point pollution, the most effective reduction techniques are carefully prepared and enforced municipal land use ordinances. By requiring management of storm water runoff and protecting buffers along streams and other environmentally sensitive lands, municipalities can make a major contribution toward establishing and maintaining good water quality in the Delaware and its tributaries.

A number of streams that flow into the Delaware River within the Plan area have been designated by their respective state as having high water quality.

Important Water Resources in New Jersey

New Jersey's waters, as related to their ability to support trout, are defined in the NJ Department of Environmental Protection's Surface Water Quality Standards as follows:

Chuck Barscz

Paulinskill River, New Jersey

Trout Production Waters – Waters designated for use by trout for spawning or nursery purposes during their first summer.

Buckhorn Creek, Warren County
Lopatcong Creek, Warren County
Merrill Creek, Warren County
Pohatcong Creek, Warren County

Trout Maintenance Waters - Waters designated for their support of trout throughout the year.

Delawanna Creek, Warren County
Hakihokake Creek, Hunterdon County
Musconetcong River, Warren & Hunterdon counties
Paulinskill River, Warren County
Pequest River, Warren County

Important Water Resources in Pennsylvania

The Pennsylvania Department of Environmental Protection designates certain streams as High Quality or Exceptional Value waters as defined in Chapter 93 of its rules and regulations. The definitions are as follows:

High Quality Waters – A stream or watershed which has excellent quality waters and environmental or other features that require special water quality protection.

Aquetong Creek, Bucks County
Cuttalossa Creek, Bucks County
Frya Run, Northampton County
Paunacussing Creek, Bucks County
Rapp and Beaver Creeks, Bucks County (3rd order) – headwaters of Tinicum Creek

Exceptional Value Waters – A stream or watershed which constitutes an outstanding national, state, regional, or local resource, such as: waters on national, state or county parks or forests; waters which are used as a source of unfiltered potable water supply; waters of wildlife refuges or state game lands; waters which have been characterized by the Fish Commission as "Wilderness Trout Streams;" and other waters of substantial recreational or ecological significance.

Bushkill Creek, Forks Township, Northampton County
Cooks Creek, Durham Township, Bucks County
Tinicum Creek, Bucks County
Tohickon Creek, Bucks County

Natural Resources

The lower Delaware River includes a diversity of ecosystems that support unique vegetation and wildlife. It flows through rolling hills and broad valleys; cliffs and palisades have emerged where the river has cut deeply into the rock. Rare plants cling to rock outcrops. On shelves of north-facing cliffs in Pennsylvania grow Arctic-Alpine plants such as Rosey sedum, while cacti dot the cliff shelves on the south-facing New Jersey side. Woodlands cover many of the river islands and the sloping hills, cliffs, and palisades along its banks providing habitat for an abundance of wildlife including the endangered *Bald Eagle* and *Peregrine Falcon*. The water itself supports a diversity of fish populations. The river's valuable natural resources provide a sense of timeless beauty and peacefulness to all who take the opportunity to experience it. Following is a description of the natural resources in greater detail:

Geologic features whose natural values have attained recognition through national and/or state designation —

New Jersey

Devil's Teatable: An eroded Triassic rock perched on a cliff located in Kingwood Township, N.J.

Milford Bluffs: Nearly vertical cliffs showing a good exposure of Triassic Brunswick shale and border conglomerates. Habitat for many state listed species of rare and endangered plants.

Pennsylvania

Delaware River Section of Stockton Formation: Typesection for the Triassic Stockton Arkose. Well-developed outcrops between Lumberville and Centre Bridge, PA.

Durham Caves: Limestone underground formation near Delaware River once more extensive. Fossil bones of extinct animals and prehistoric Indian remains were found in late 1800s.

Durham Mines: Historic iron ore mines of the Durham Furnace where cannons and cannonballs were produced for George Washington's Army. Founded in the early 1700s, it is long abandoned. Shafts have become an important bat hibernaculum, recognized as the second most important in the state.

Elephant Rock: Barren summit of Bougher Hill. Outcrop of Byram gneiss, one of oldest rocks in North America.

Hexenkopf Rock: (Frya Run) Barren summit of Bougher Hill. Outcrop of Pochuck gneiss, one of oldest rocks in North America (Precambrian).

Monroe Border Fault: Oldest surface rock in North America; exposed granite, granite gneiss and amphibolite.

Nockamixon Cliffs: An escarpment of high shale cliffs which are home to unique Arctic-Alpine plants.

Geology

The character of the lower Delaware River corridor's geology changes dramatically over the corridor's length. Geologists have classified geologic differences by assigning them to geologic provinces. The lower Delaware corridor encompasses four such provinces, beginning at the northern end of the corridor with the Valley and Ridge Province. Like all of the geologic provinces, the Valley and Ridge is a band which crosses the river in a more-or-less east-west direction. The topography of the lower Delaware River is quite dramatic in the Valley and Ridge Province and gradually flattens as one proceeds southward through the New England and Piedmont Provinces, until reaching the Coastal Plain Province near Trenton, where the landscape becomes quite flat. The Coastal Plan Province, in fact, is a fairly recently elevated sea bottom.

Mineral resource extraction has a long history in the corridor. Fluxistone and iron ore mining and dimention stone quarrying flourished intermittently during the eighteen and nineteenth centuries. Presently basalt used for manufacture of asphalt, concrete and other construction purposes, sand, gravel, and dimention stone are mined in the corridor.

Vegetation/Critical Habitat

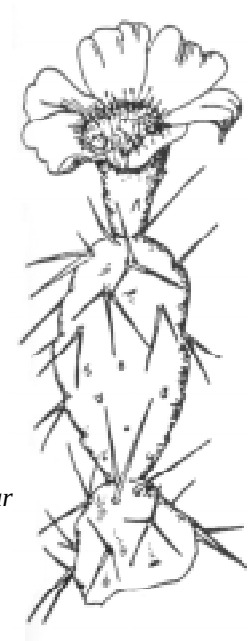
There is a variety of vegetation in the plan area resulting from differences in elevation, aspect, climate, physiography, geology and land use. Within the Piedmont uplands of red shale, red cedar grow on abandoned farms. They are eventually shaded by taller maples and oaks. North of the Piedmont in the New Jersey Highlands Province, the plant species in the early successional stages are dominated by gray birch and large-toothed aspen. Major tree species identified in the study corridor include: black, grey, river and yellow birch; red maple; red oak; white ash; large-toothed and trembling aspen; black locust, walnut, and black cherry; sycamore; and hemlock. Shrubs include willow, spirea, silk dogwood, and alder. Woody species above the floodplain include blueberry, huckleberry, rhododendron, mountain maple, staghorn sumac, sweet fern, and witch hazel. Vegetation along the river corridor provides valuable habitat for birds and other animals and shade for fish in the river.

Some areas contain special vegetation features including rare plant species, unique or unusual floral habitats, or outstanding individual specimens. For example, in some areas

Ringing Rocks: A four-acre field of large diabase boulders which, when hit with a hammer, ring in various tones.

Tohickon Creek: Triassic Lockatong and Brunswick Formations: An example of orogenic compression, the folding and thrusting in which Precambrian rocks were thrust northward over lower Paleozoic deposits.

Tohickon High Rocks: A nearly 190 foot vertical cliff formed at the interface of a band of Lockatong argillite and a band of Brunswick shale.



Prickly Pear Cactus

sheer cliffs, rising to 400 feet above the valley floor, support special flora found at no other sites in the area. Rapid drainage and exposure to winds and sun makes southern facing cliff habitats dry and desert-like. *Eastern red cedar* is the dominant tree. *Mountain spleenwort* and *Goat's rue* are commonly found on crests and ledges or in rock crevices. Flora on cliffs such as Milford Bluffs in Hunterdon County and Nockamixon Cliffs in Bucks County is rare for the northeastern U.S. *Roseroot*, an arctic-alpine herb that grows on shelves and crevices near the top of these cliffs, is in its southern-most habitat here. Prickly Pear is abundant on Milford Bluffs which also provide habitat to *Green Violet* and *Smooth Veiny Peavine*, both on the NJ endangered plant list.

Bull's Island, about 3.5 miles north of Stockton, NJ has an exemplary forested floodplain habitat with mature sycamore, silver maple, locust and box elder. The southern portion of the island is a Natural Area, designated by New Jersey for its northern floodplain habitat and rare species habitat.

Continued development in the region is altering the composition of the forests because as these forests are fragmented, more forest edge is created causing a great increase in plant species that thrive in edge habitats.

The Nature Conservancy, in cooperation with the states of New Jersey and Pennsylvania, have identified "critical habitats" in the corridor. Meeting the outstandingly remarkable resource criteria are:

New Jersey

Alpha (Pohatcong) Grasslands
Bull's Island
Burlington Island
Byram Hillside
Delaware River Bridge at Stockton
Delaware River Floodplain, Delaware Township
Delaware River Floodplain, Harmony Township
Delaware River Floodplain, Knowlton Township
Garrison Road Site
Goat Hill
Hawk Island
Holcombe Island
Javes Road site (wetland at Hakihokake Creek)
Kingswood Township Bluffs
Manunka Chunk Bluffs
Milford Bluffs
Mine Hill
Mount Tammany
Newbold Island

Plant species existing in the plan area that have regional significance and meet the criteria for documentation as outstandingly remarkable resources include:

New Jersey

American Purple Vetch
Basil Bee-balm
Basil Mountain Mint
Blackberry Species
Broadleafed Waterleaf
Bush's Sedge
Carolina Wood Vetch
Ellisia/Aunt Lucy
False Pennroyal
Few-flowered Panic Grass
Foxtail Sedge
Great St. John's-wort
Green Violet
Hairy Lipfern
Ledge Spike-Moss
Low Sand Cherry
Lowland Brittle Fern
Missouri Goosefoot
Pawpaw
Plantain-leaved Sedge
Round-leaved Serviceberry
Nebraska Sedge
Ohio Spiderwort
Pale Indian Plantain
Redbud
Side Oats Gramma Grass
Small-fruited Groovebur
Smooth Hedge-nettle
Smooth Veiny Peavine
Squirrel-corn
Torrey's Mountain Mint
Twinleaf
Veined Skullcap
Wafer Ash
Wild Confrey
Willow-leaved Aster
(*continued*)

Phillipsburg Bluffs
Pohatcong Mountain
Riegelsville Bluffs
Scudders Falls Islands
Strawberry Hill
Treasure Island

Pennsylvania

Biles Island
Delhaas Woods County Preserve
Durham Mines
Frya Run Creek
Hendricks Island
Jacoby Creek
Maple Beach
Mariton Wildlife Sanctuary
Marshall Island
Mine Hill
Morrisville river shore
Mud Island
Nockamixon Cliffs
Paunacussing Creek
Scudders Falls Islands
Sol and Rose Conservation Area
Van Sciver Lake

Fisheries

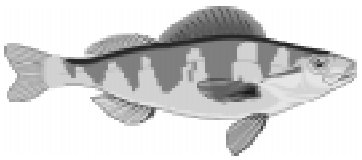
The lower Delaware River supports a wide diversity of anadromous and resident fish populations that are important commercially, recreationally and ecologically. Migratory species such as American shad, striped bass and river herring are increasing in the river in response to improved water quality and fish management. Their continued survival is dependent on the water quality of the river's lower reaches. Resident species such as smallmouth bass, channel catfish, walleye pike, hybrid muskellunge, white catfish, bullhead, white perch, sunfish, suckers, and eels add to this important recreational fishery.

One of the most recreationally and economically important fish species in the river basin is the *American Shad*, a New Jersey state threatened species. Populations of American Shad have increased tremendously in response to improved water quality. Today, approximately 900,000 adult American Shad ascend the Delaware River each spring. Fish ladders have been installed at Easton to allow shad to migrate up the Lehigh River. Annual shad festivals held in Lambertville, NJ and Easton, PA, and the Delaware River Shad Fisherman Tournament illustrate the successful relationship between tourism and fisheries.

Pennsylvania

Atlantic Sedge
Bicknell's Sedge
Brook Lobelia
Common Hop Tree
Eastern White Water-Crow
Ellisia/Aunt Lucy
Grass of Parnassus
Hoary Willow/Sage-leaved Willow
Northern Pondweed
Prickley-Pear Cactus
Roseroot Stonecrop
Sand Cherry
Small-flowered Crowfoot
Spring Coral Root
White Heath Aster
Wood's Sedge
Whorled Nut-rush

The federally listed endangered *Shortnose Sturgeon* is concentrated in the estuary between Philadelphia and Trenton and is known to spawn in the Yardley and Lambertville areas. The globally rare *Atlantic Sturgeon* travels upriver as far as Trenton.



Coldwater fisheries are supported in numerous creeks entering the river in the plan area. Many creeks are stocked with trout and are accessible to the public.

River management practices could impact the diversity or the balance of fish and other aquatic life in the corridor. Diversion and release of the water, as well as dredging in the estuary, might create conditions that favor some species over others. The use of high speed boats and personal water craft, particularly in the shallower sections of the river, could also be altering the habitat for many species.

Wildlife

Many species of wildlife exist in the plan area, some of which are rare, threatened, or endangered.

Important reptile and amphibian species known to occur in or near the river corridor area include bog turtles, New Jersey chorus frogs, coastal plain leopard frogs, eastern mud turtles, and red-bellied turtles. The bog and/or red-bellied turtles occur at sites within the Cooks Creek watershed in upper Bucks County, Frya Run Creek, on the Delaware near Washington Crossing, and in Trenton-Hamilton Marsh in the southern portion of the plan area.

Among mammal species, white-tailed deer populations have increased notably since the early 1900's in New Jersey and Pennsylvania. Many naturalists are concerned that deer have increased in such numbers that they threaten the existence of many of the plant species they eat. Deer may also threaten other animal species that rely upon the same food for survival.

Beaver and river otter are active along the Delaware. Four endangered, threatened or rare bat species inhabit parts of Upper Bucks (PA) and Hunterdon (NJ) counties in the river corridor vicinity: *Keen's bat, Small-footed bat, Northern Long-eared bat, and Indiana bat.*

The plan area is recognized on a national and state level for many characteristics related to bird breeding and migration:

"The Delaware River is an extremely important corridor for bird life, and other wildlife as well...bald eagle are making a comeback and they use the river for habitat...the osprey was endangered for a while, it's coming back now..."

Jan Holms, Nockamixon Township Environmental Advisory Council

- It is located along the Atlantic Flyway, one of four major waterfowl migratory routes in the U.S.
- The Nockamixon Cliffs historically provided nesting sites for the federal and state-endangered Peregrine Falcon. They last nested here in the 1940's and reintroduction efforts have brought them back from the edge of extinction.
- Bald Eagles, federal (until 1994) and state endangered, use the river's shoreline and islands for winter habitat.
- State endangered osprey are also making a comeback along the Delaware River through a reintroduction program.
- The Least Bittern, a PA threatened species, breeds in Upper Bucks County and the Trenton-Hamilton Marsh.
- The Alpha (Pohatcong) Grasslands are noted for nesting grassland species that are declining and for over-winter populations of Northern Harriers and Short Eared Owls.
- Mature hardwood forests of the river's floodplain and islands are important breeding areas for declining neo-tropical bird species.

Potentially important areas for migrating birds include the many small ravines and stream valleys along the river and its tributaries, floodplains, and other wetland areas, river islands, and wooded corridors. A critical concern for species in the plan area is preservation of remaining habitat. The following is a list of birds in the plan area that are endangered or threatened:

Endangered:	Bald Eagle	
	Osprey	
	Peregrine Falcon	
Threatened:	American Bittern	Least Bittern
	Bobolink	Northern Harrier
	Common Snipe	Red-headed Woodpecker
	Cliff Swallow	Red Shouldered Hawk
	Cooper's Hawk	Savanna Sparrow
	Grasshopper Sparrow	Upland Sandpiper
	Great Blue Heron	Yellow-bellied Flycatcher

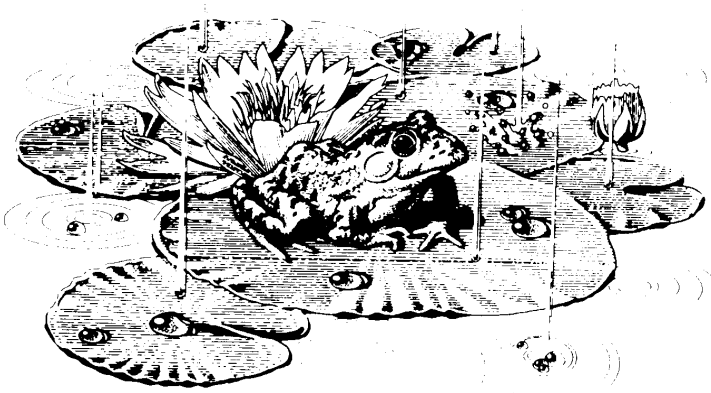
Delaware River Islands

There are about 50 islands in the plan area, varying in size from a few gravel mounds in summer to forested habitats of more than 300 acres. Ownership of the islands is divided nearly equally between private and public interests. Because of limited access and seasonal flooding, the islands remain relatively natural, a condition that is considered by many to be of very

great importance to the continued natural charm of the corridor. Permanent preservation of the islands has been a high priority for many environmental groups.

The islands provide critical stopovers for migratory birds, and the shallow water areas around them are important nurseries and feeding grounds for a variety of fish. The forested islands provide a rich environment for nesting waterfowl, herons and songbirds.

Islands that contain habitat recognized as "critical" for endangered native plant species are included in the list on pages 29-30.



Wetlands

Wetlands, once thought to have little or no value, are now recognized as a vital link in our ecological system. Wetlands nurture some of the most uncommon plants in the region, including wild rice on which migrating waterfowl feed. The following is a list of critical wetlands in the Plan area:

New Jersey

Trenton/Hamilton Marsh, 1,200 acres; most northerly tidal marsh on the Delaware River.

Pennsylvania

Bristol Marsh, one of three remaining freshwater tidal areas on the river.

Kauffman Hill Swamp, 400 acres, Bridgeton and Nockamixon townships

Quakertown Swamp, headwaters of the Tohickon Creek

Historic Resources

The lower Delaware River contains historic resources of great national significance; it is a microcosm of American history. Colonial development, the American Revolution, transportation evolution, the Industrial Revolution, urbanization, suburbanization, art and theater are all represented within the corridor.

Historic and cultural sites and districts which are listed on the National Register of Historic Places:

New Jersey

Belvidere Historic District
Berkeley Square Historic District
Bordentown Historic District
Borough of Frenchtown Historic District
Burlington Historic District
Calhoun Street Bridge over the Delaware River
Delaware and Raritan Canal National Historic Landmark
Early Trenton Historic District
General Dickinson House
Jacob's Creek Somerset Mills
Lambertville Historic District
McCall Mansion, Cadwalader Park
Morris Canal National Historic Landmark and Morris Canal Arch

(continued)

The river provided access to the region for both Native Americans and European settlers and defined development patterns. Virtually every major town on both sides of the river in the plan area began as a ferry crossing.

The first public reading of the Declaration of Independence took place in Easton on July 8, 1776. George Washington's crossing of the Delaware on Christmas Eve is an event known by most school age children in the United States. The development of canals and railroads along the river in the nineteenth century allowed mineral wealth and farm products to reach growing urban markets.

Before European settlement, the Lenni Lenape hunted and fished along the Delaware and its tributaries. Many Native American archaeological sites have been documented along the corridor. The names of numerous towns, roadways and creeks are taken from the Native American language, such as Tohickon, Tinicum, Lopatcong, Pohatcong, Paunacussing, Wichecheoke, Aquetong, and Pequest.

A re-enactment of Washington Crossing the Delaware takes place each year.

European settlement began in the seventeenth century and by the end of the eighteenth century had significantly changed the environment. Forests were cut, sawmills built, land cleared for farming, and roads opened.

The 1800's brought major technological changes, and the Industrial revolution was underway. The Delaware River corridor had all the natural assets needed to spur vibrant industrial growth. It was rich in the essential resources—water, coal, wood, and iron—and occupied a prime location.

In the nineteenth century canals were established to aid in the transportation of anthracite coal from the Lehigh River region to rapidly growing industrial markets in Trenton, Philadelphia, New York, and elsewhere. The Delaware Division of the Pennsylvania Canal, the Delaware and Raritan Canal, and the Morris Canal were built for that purpose. The canals were largely hand-dug by local farmers and Irish immigrants using picks, shovels, and wheelbarrows. Towns developed at the terminus of the canals. Smaller towns emerged along the canals, and parallel

Old Barracks National Historic Landmark
Pennsylvania Railroad Bridge over the Delaware River
Pleasant Valley Rural Historic District
Point Breeze Historic District
Prallsville Mills Historic District
Pursley's Ferry Historic District
Ralph Kuser Mansion
Roebling Historic District
State House Historic District
Titusville Historic District
Washington Crossing National Historic Landmark
William Trent House National Historic Landmark

Pennsylvania

Andulusia – estate of Nicolaus Biddle, head of first Bank of the U.S.
Upper Aquetong Valley Historic District
Bristol Historic District
Bristol Industrial Historic District
Brownsburg Historic District
Carversville Historic District
Centre Bridge Historic District
Coffeetown Grist Mill
Delaware and Lehigh Canal National Heritage Corridor and State Heritage Park
Delaware Canal National Historic Landmark
Easton National Register Historic District
Frya Run Bridge
Grundy Mill Complex
Historic Fallsington District
Harriman Historic District
Honey Hollow Watershed National Historic Landmark
Jacoby Creek Bridge
Jefferson Land Association Historic District
Lumberville Historic District
New Hope Historic District
Pennsbury Manor – home of William Penn
Phillips Mill Historic District
Point Pleasant Historic District
Ridge Road Rural Historic District
Slate Hill Cemetery
Summerseat – home of Robert Morris, financier of the Revolution
Three Arches – home of John and Mary Sotcher, steward and housekeeper to William Penn.
Uhlerstown Historic District
Washington Crossing National Historic Landmark

railroads were built soon after the canals. The Delaware Canal, which operated between 1827 and 1932, is now a State Park used for recreational purposes by thousands each year and is a National Historic Landmark. The Delaware Canal is also an important component of the Delaware & Lehigh Canal National Heritage Corridor. The Delaware and Raritan Canal, which serves today as a water supply system, is also a State Park and a National Historic Landmark. Interest is growing in protecting and interpreting the remains of the Morris Canal.

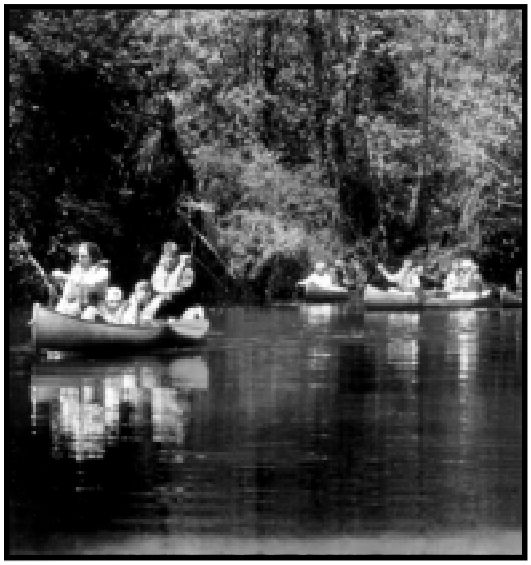
The river shaped the emerging economic/physical landscape in ways that are enduring. Above the fall line at Trenton, development of towns was limited, and tributary streams fall sharply from the highlands down into the river valley. Gristmills and sawmills were built near the Delaware River along many of these tributaries to exploit the water power. Though many mills have been destroyed, several remain. Limekilns were built on the river's edge, the ruins of which are still found near Uhlerstown and Phillipsburg.

The significance of the scenic river, historic canals and towns, and remnants of early industries has already been recognized by: Congressional designation in 1988 of the Delaware and Lehigh Navigational Canal National Heritage Corridor, a key component of which is the Delaware Canal; designation of twenty-nine National Historic Districts as well as eight National Historic Landmarks. In addition, thousands of other archaeological and historic sites along the river corridor have been identified and mapped.

Funding to encourage historic preservation through documentation, acquisition, restoration, development and interpretation is limited. The problem is compounded by lack of coordination between municipalities, non-profits, states, and other programs. Regional programs like the D&L Heritage Corridor are a strong advance toward better coordination. However, given the significance of the area's historic resources and their potential for economic development, the regional commitment to their preservation and interpretation is weak.

Recreational Resources

Because of its great beauty and many natural and cultural resources, and because the Delaware River is within a day's drive of 40% of the U. S. population, it is an extraordinarily important recreational resource for millions of people. One can expect to see almost any kind of recreational boat on the river — canoes and kayaks, speed boats and jet skis, fishing boats, shells, excursion boats with pontoons and fringe-lined roofs —and in many places the river is dotted in summer with people floating with the current on innertubes. Hikers, joggers, and bicyclists crowd the canal paths on either side of the river. Fishermen, bird watchers, and people seeking a natural landscape are drawn in great numbers to the corridor. Campgrounds are scarce in the corridor, but those that do exist are popular.



Delaware River Greenway

Trenton-Hamilton Marsh, New Jersey

There are large number of state and local parks in the corridor. The Delaware and Raritan Canal State Park (NJ) and the Delaware Canal State Park (PA) are popular recreational corridors. Both have trail systems designated as National Recreational Trails. While these parklands provide a wealth of recreational opportunities, they are primarily disconnected "areas" of recreation and do not represent a cohesive recreational system. A lack of sufficient public facilities and boating access is also a limiting factor to these areas, a situation that has its benefits as well as its problems.

The use of the corridor for recreation brings with it many difficulties. While the great majority of people drawn to the corridor for recreation are respectful of the region's fragile resources and of the rights of others, enough people lack this respect that conflicts arise. The privacy and security of property owners are often violated by boaters, tubers, and others. Trash is often discarded without consideration.

No recreational issue in the lower Delaware River corridor raises more comment than the use of personal water craft, commonly called Jet Skis. These vehicles are frequently modified in ways that maximize the amount of noise they can make — a level of noise that intrudes on any other activity in the corridor. Furthermore, the drivers often create a situation that frightens other boaters and river users by riding at high speeds in circumstances that are often unsafe. These water craft also disrupt wildlife both by their loud, intrusive noise and by disturbing the ecosystem of the river's shallow areas.

Protected open space and public parks in the plan area:

New Jersey

Blaugard Island
Bulls Island Recreation Area
Cadwalader Park
Columbia Lake Wildlife Management Area
Delaware & Raritan Canal State Park
Delaware Watergap National Recreation Area
Dildine Island, Macks Bar
Eagle Island
Frenchtown Municipal Park
Lockatong Creek Preserve
Milford Bluffs Preserve
Musconetcong Gorge County Preserve
Kittatinny Valley Trail State Park
Phillipsburg Riverfront Park
Roebling Memorial Park, Trenton Marsh
Rotary Island
Rush Island

(continued)

Shandor Island
Trenton Riverfront Park
Washington Crossing State Park

Pennsylvania
Bowman's Hill Wildflower Preserve
Bristol Borough Riverfront Park
Delaware Canal State Park
Delaware Watergap National Recreation Area
Easton Riverfront Park
Falls of Delaware Park
Frost Hollow County Park
Frya Run County Park
Hal Clark Park
Lehigh Canal-Hugh Moore Park Heritage Corridor
Macclesfield Municipal Park
Martins Creek Recreation Area
Morgan Hill Island
Mount Jack County Park
Mud Run County Preserve
Neshaminy State Park
Nockamixon Cliffs
Nockamixon State Park
Old Sow Island
Pen Ryn County Park
Pennsbury Manor State Park
Prahls Island group
Ralph Stover State Park
Raubs Island
Ringing Rocks County Park
Silver Lake County Park
State Gamelands #56 (Rapp and Beaver creeks)
Tinicum County Park
Tohickon Valley Park
Washington Crossing State Park
Waterfront Park, Falls Township
Whippoorwill Island
Williamson Municipal Park
Wy-Hit-Tuk County Park

Citizen protest has prompted legislative review of ways to control personal water craft use. New Jersey passed new safety regulations effective July 1, 1997, which require operators of personal watercraft to be at least 16 years of age and to obtain a boating safety certificate. However, no satisfactory solution is yet in view. Action must be taken jointly by New Jersey and Pennsylvania, and enforcement must be provided on a far higher level than presently exists on either side of the river. This enforcement can only be created by the allocation of more money for the enforcing bodies, a difficulty given the present budget restrictions in both states.

Scenic Resources

The lower Delaware River corridor provides year-round scenic opportunities. During the summer, lush vegetation along the river's floodplain and wooded slopes provides surprisingly "natural" landscapes. Fabulous fall colors combined with the pleasant autumn climate make the corridor an excellent site for color tours and outdoor opportunities. Winter provides dramatic natural ice sculptures on bluffs and cliffs. Spring heralds nature's migration and the songbirds reappear.

The traveler can choose to take to the water at various public access points to view the waterway. The view from the river provides a sense of being in pristine surroundings. Public riverfront parks have been established in some municipalities, but access to the river is still limited in many areas.

On the other hand, travel by roadway not only provides beautiful views of the river and canals, but passes through historic riverside towns. In Pennsylvania, River Road (Routes 32 & 611) from Kintnersville to Morrisville is a Pennsylvania Scenic Road. New Jersey's River Road (Route 29) between Frenchtown and Trenton has been designated a New Jersey Scenic Byway.

The Delaware River offers tranquil and often dramatic rural scenery that has become increasingly rare in the highly urbanized Northeast corridor.

Economic Resources

Jeffrey Marshall

Mules tow canal boats along the Delaware Canal.

Land use between the Delaware Water Gap and Washington Crossing is a complex mix including agricultural, small towns, light commercial uses, growing suburban-style residential development, second-home and vacation residential development, tourist facilities such as restaurants, bed and breakfasts and river-related recreational facilities, and public lands. Despite the intensive use, the lower Delaware River corridor has retained much of its natural shoreline and highly scenic quality.

The river corridor between south of Washington Crossing and the southernmost border of the plan area at the Bucks County/Philadelphia line is the most densely populated with cities, suburban residential areas and light industrial uses. Trenton is the largest urban center in the lower Delaware River corridor. Major residential development occurred in lower Bucks County from 1950 to 1965 when Levittown and Fairless Hills were constructed to house employees of the USX Corporation Fairless Works, still the largest industrial complex in the plan area. The opening of Interstate Route 95, which crosses the river above Yardley, PA, led to increased residential subdivisions. Industrial sites are primarily located in the Easton, PA area and in the tidal estuary portion of the plan area beginning at Trenton, NJ and Morrisville, PA and extending down river to the southern plan area boundary. An expanding land use in the lower reaches in recent years is trash disposal landfills and processing plants.

Urban areas in the corridor are important as focal points for access to and celebration of the river and are valuable economic generators. Economic development is a significant component in the provision of jobs and in maintaining a balanced and prosperous economic base that not only helps attract visitors, but provides the tax base to support the preservation efforts of local governments.

The lands in and around the plan area are in great demand for new residential and commercial development, creating pressures that can threaten the fragile environment and scenic beauty of the river corridor. Economic prosperity depends upon

both continued growth and preservation of the corridor's natural and cultural resources. Achieving these two often-conflicting goals will require a more region-wide approach to development than presently exists.

The historic treasures and scenic beauty of the Delaware River corridor offer numerous economic opportunities pertaining to "Eco-tourism." Many travelers are seeking destinations that provide historical and cultural stimulus as well as a chance to commune with nature through hiking, boating, bird watching, camping, etc.

More than three centuries of growth has left the Delaware River corridor a unique legacy. It is reflected in the area's prominent position in the nation's history, in the commerce and industry that grew up there and still characterize the region, in the ethnic and cultural diversity of the area, and in the wealth that its commerce and productivity have generated. The challenge now is to preserve that legacy while providing for managed economic growth.

Open Space

Preservation of open space is the basis for preserving all of the outstandingly remarkable resources in the lower Delaware River corridor. It is critical to water quality because it is from developed areas — not from natural lands — that pollution flows into the ground and surface waters. Natural areas have more stable soils than places where development has occurred, thus reducing the turbidity of storm water that runs off a site after a rainfall. Finally, natural lands in this region will eventually support a deciduous forest. Trees shade the water in smaller streams, cooling it and increasing the water's ability to contain oxygen, one of the most important elements in countering water pollution.

The preservation of open space is also the surest way of preserving habitat for rare and endangered plant and animal species. Some of these species scan survive in developed areas, but habitat loss is the primary reason that these species become rare or endangered.

Historic sites in the corridor are also dependent upon the preservation of open space. If a historic structure is preserved but the land around it experiences modern development, the structure often looses its context and much of its historic value.

"It is impossible to separate the solutions to the problems of pollution and depletion of the river from the reforms in land use planning and regulation..."

The Delaware River Basin, 1975, Council on Environmental Quality.

The importance of open space to the preservation of scenic values and to recreation sites is obvious. Any loss of open space in the corridor would significantly reduce the scenic character and recreational opportunities that made the river corridor eligible for National Wild and Scenic designation. Recreational opportunities in the corridor are almost entirely dependent upon preserving open space. Boaters, bird watchers, campers, hikers, cross-country skiers, tubers — virtually all who come to the corridor for recreation — need open space for their activities and depend upon it to assure that the corridor is attractive enough to make it a suitable place for such activities.

Agricultural land is an important component of open space. Compared to most types of land uses, properly managed agriculture preserves many natural and cultural values such as retention of critical aquifer recharge areas, protection of critical wildlife areas, maintenance of natural stream flow, conservation of prime soils, preservation of rural or historic character, and preservation of scenic landscapes. Farmlands reduce some of the extensive costs associated with scattered development. Farmlands also reduce the negative environmental impacts that diminish the attractiveness of the Delaware Watershed. Farmlands consistently generate more tax revenue than it requires in service expenditures. In contrast, residential areas require services that cost more than the tax revenue they generate. Equally important, farmers often possess valuable knowledge of their community's natural and cultural environment. The lower Delaware River and its tributaries include extensive agricultural lands along their shores, contributing to their outstanding scenic value.

Delaware River Basin Commission

A dramatic example of changing land use, this 1930 photo of Washington Crossing shows that the primary land use was farming.

The Northeast corridor is the most densely populated area in the country. The Delaware River corridor presents a rare opportunity for solitude and oneness with nature. Preserving this quality is important to the social and cultural health of the public and the economic health of the region.